David Kurniadi Angdinata

📱 *+44 7551 733331*
✉ *ucahdka@ucl.ac.uk*
🌐 *multramate.github.io*
github.com/Multramate

Education

09/21 – 09/25 **PhD Mathematics**, *London School of Geometry and Number Theory*, London
Supervisors: Prof Vladimir Dokchitser and Prof Kevin Buzzard.
Research interests in: local to global principles, rational points on varieties, arithmetic of elliptic curves, formalisation of number theory.

10/20 – 06/21 **MASt Pure Mathematics**, *University of Cambridge*, Cambridge
Pass with Merit.

10/16 – 06/20 **MEng Pure Mathematics and Computational Logic**, *Imperial College*, London
Best overall performance in degree cohort.

01/14 – 12/15 **Singapore-Cambridge GCE A-level**, *Temasek Junior College*, Singapore
A in four subjects and merit in NUS Modern Physics.

01/12 – 12/13 **Singapore-Cambridge GCE O-level**, *Anderson Secondary School*, Singapore
A in seven subjects and a top student award.

Employment

07/22 – 09/22 **Research assistant**, *Huawei Technologies R&D UK Ltd*, London
Summer internship on formalisation of modern mathematics in automated theorem proving.

06/19 – 09/19 **Cryptography engineer**, *Adjoint UK Ltd*, London
Developed three highly polymorphic libraries for zero-knowledge proof protocols in Haskell:
○ `galois-field` — an efficient implementation of finite field arithmetic,
○ `elliptic-curve` — an extensible database of elliptic curve operations, and
○ `pairing` — a polymorphic library for bilinear pairing algorithms.
Published on Hackage as: `hackage.haskell.org/package/<name>`

Projects

Number theory

09/22 – **Central algebraic values of twists of elliptic L-functions**
Ongoing research project, LSGNT (supervised by Prof Vladimir Dokchitser)

11/22 – 01/23 **An elementary formal proof of the group law on Weierstrass elliptic curves in any characteristic**
Lean project, LSGNT (joint with Junyan Xu)
Accepted in the international conference on Interactive Theorem Proving

12/21 – 06/22 **The Mordell-Weil theorem in Lean**
Mini project, LSGNT (supervised by Prof Kevin Buzzard)
Formalised complete 2-descent and naïve heights assuming associativity of the group law.

12/21 – 04/22 **The Birch and Swinnerton-Dyer conjecture**
Group mini project, LSGNT (supervised by Prof Vladimir Dokchitser)
Traced the work of Kolyvagin on the Euler system of Heegner points and computed examples.

10/19 – 06/20 **Arithmetic statistics for elliptic curves**
Masters thesis (88%), Imperial College (supervised by Prof Toby Gee)
Modelled the Selmer group of an elliptic curve over a number field as an intersection of Lagrangian direct summands in an ambient metabolic quadratic module of infinite rank.

07/19 – 09/19 **Class field theory and applications**
UROP project, Imperial College (supervised by Dr David Helm)
Reproduced the proof of global Artin reciprocity via Galois cohomology of idele class groups.

08/18 – 09/18 **The arithmetic of elliptic curves**
UROP project, Imperial College (supervised by Prof Johannes Nicaise)
Explored the arithmetic of elliptic curves and discussed their contemporary applications.

Miscellaneous

06/18 **An introduction to finite projective planes**
Group project (77%), Imperial College (supervised by Dr Ambrus Pál)

01/18 – 03/18 **Pintos**
C group project (81%), Imperial College

10/17 – 12/17 **WACC**
Haskell group project (94%), Imperial College

05/17 – 06/17 **MelodyPi**
C group project (4th amongst first year groups), Imperial College

Talks

29/03/23 **Beyond the Brauer-Manin obstruction**
Study group on the Brauer-Manin obstruction, LSGNT

18/01/23 **Introduction to abelian varieties over finite fields**
Study group on abelian varieties over finite fields, University College

17/01/23 **Class number formula, à la Tate**
London Junior Number Theory Seminar, King's College

30/11/22 **Examples of Brauer groups**
Study group on the Brauer-Manin obstruction, LSGNT

22/11/22 **Tate's thesis and epsilon factors**
Study group on Galois representations and root numbers, University College

29/09/22 **Elliptic curves and Mordell's theorem**
2022 Xena Project Undergraduate Workshop, Imperial College

24/08/22 **Formalisation of elliptic curves in Lean**
Young Researchers in Algebraic Number Theory, University of Glasgow

05/08/22 **Étale cohomology**
Study group on étale cohomology, LSGNT

05/07/22 **The Tate-Shafarevich and Brauer groups**
Study group on curves over function fields, University College

26/05/22 **Elliptic curves and the Mordell-Weil theorem**
London Learning Lean, Imperial College

10/05/22 **The Euler system of Heegner points**
London Junior Number Theory Seminar, King's College

05/05/22 **Kolyagin's work on the BSD conjecture**
Mini project presentation, LSGNT

25/04/22 **Elliptic curves in Lean**
Mathematical Theorem Proving Workshop, Huawei Technologies R&D UK Ltd

06/10/21 **Ideal class groups**
Short introductory talk, LSGNT

04/12/20 **Rank heuristics for elliptic curves**
Part III Seminar Series, University of Cambridge

22/06/20 **Arithmetic statistics for elliptic curves**
Masters thesis presentation, Imperial College

11/03/20 **The ideal class group is a Tate-Shafarevich group**
Presentation, Essen Seminar for Algebraic Geometry and Arithmetic

04/10/19 **Cryptography engineering at Adjoint UK Ltd**
Industrial placement presentation, Imperial College

13/09/19 **Pairing-based elliptic curve cryptography**
Lunch and Learn, Adjoint UK Ltd

16/01/19 **An unusual cubic representation problem ($\frac{a}{b+c} + \frac{b}{a+c} + \frac{c}{a+b} = 4$)**
Undergraduate Mathematics Colloquium, Imperial College

Teaching

11/22 –	**Department of Mathematics teaching assistant**, *King's College*, London
	Ran weekly tutorials for mathematics courses in year 2 (number theory, discrete mathematics).
01/22 –	**Private university tutor**, *TutorChase/ElitePrep*, London
	Tutored a range of topics in introductory mathematics (proof writing, differential equations, linear algebra, group theory, real analysis, complex analysis, metric spaces, topological spaces), advanced mathematics (topological manifolds, Galois theory, algebraic number theory, local fields, algebraic geometry), and basic computer science (LaTeX writing, Java programming, discrete mathematics, programme reasoning, information structures, graph algorithms)
10/21 –	**Department of Mathematics teaching assistant**, *University College*, London
	Ran weekly group tutorials and drop-in revision sessions for mathematics courses in year 1 (algebra 2, analysis 2) and year 2 (further linear algebra, groups and rings, number theory), assessment marking for mathematics courses in year 3 (Galois theory, logic), and supervision for year 1 term 3 projects (continued fractions, cryptography, Lean).
10/18 – 03/20	**Department of Computing teaching assistant**, *Imperial College*, London
	Held weekly group tutoring sessions for computing courses in year 1 (logic, discrete mathematics, reasoning about programmes, graphs and algorithms).

Conferences

09/23	*Young Researchers in Algebraic Number Theory*, Cambridge
07/23 – 08/23	*The international conference on Interactive Theorem Proving*, Białystok
07/23	*Iwasawa 2023: in memory of John Coates*, Cambridge
05/23	*Arithmetic Statistics*, Marseille
05/23	*Spring school in Arithmetic Statistics*, Marseille
04/23	*Arithmetic, Algebra, and Algorithms*, Edinburgh
02/23	*Symposium on Arithmetic Geometry and its Applications*, Marseille
01/23 – 02/23	*Introduction to Symposium on Arithmetic Geometry and its Applications*, Marseille
10/22 – 11/22	*Preliminary Arizona Winter School 2022: Heights and Model Theory*, Online
08/22	*Young Researchers in Algebraic Number Theory*, Glasgow
08/22	*Mordell 2022*, Cambridge
08/22	*Elliptic Curves 2022*, Clyro
06/22	*73rd British Mathematical Colloquium*, London

Awards

Scholarships

2021 – 2025	Full funding for 4-year PhD research (EPSRC CDT LSGNT, University College)
2018	UROP research studentship (Department of Mathematics, Imperial College)
2012 – 2015	Full 4-year school-based scholarship (Ministry of Education, Singapore)

Academic

2020	*Governors' MSci JMC Prize* for best overall performance in final year, £500
2020	*Donald Davies Prize* for best final year individual project, £500
2017, 18, 20	Imperial College Faculty of Engineering Dean's List
2017	*G Research Ltd Prize* for academic excellence, £100

Skills

Languages	English, Mandarin/Hokkien, Indonesian/Malay, Japanese
Programming	Lean, Haskell, Python/SageMath, Magma, Java, C/C++, Prolog
Tools	LaTeX, XHTML/CSS, Git, Stack, Vim